inclined to hesitate, to adopt this process; but I fear I must now reluctantly acquiesce in this method, in order to place the results in fair juxtaposition. Should I undertake, as I propose, to complete another set of 100 measures, I intend to take ten individual measures, properly selected, for each determination; and then I shall decline to weight the Selenocentric Latitude equations.

The general conclusions which in my judgment are arrived at by a comparison of the Strassburg with the Oxford researches are these:—

1. There does exist a real, but inconsiderable, libration in Longitude, less than five minutes of arc, and probably not ascertainable within some decades of seconds.

2. The Moon is sensibly spherical.

3. There appears but little hope of ascertaining the position of a spot upon the Moon with sufficient accuracy to admit of its use, in preference to the limb, in astronomical observations of the Moon's place.

In conclusion, I beg to tender Dr. Hartwig my hearty congratulations on the successful termination of a research, of the difficulties and delicacy of which I have a painful familiarity.

Oxford,
1881, *Jan.* 13.

Description of an Observing Seat for an Equatoreal. By Professor G. W. Hough, Director of the Dearborn Observatory.

In making micrometer measures with the equatoreal telescope, it is desirable to have a convenient seat for the observer. A person in a cramped or unnatural position can hardly do as good work as when the body is resting in an easy and natural manner.

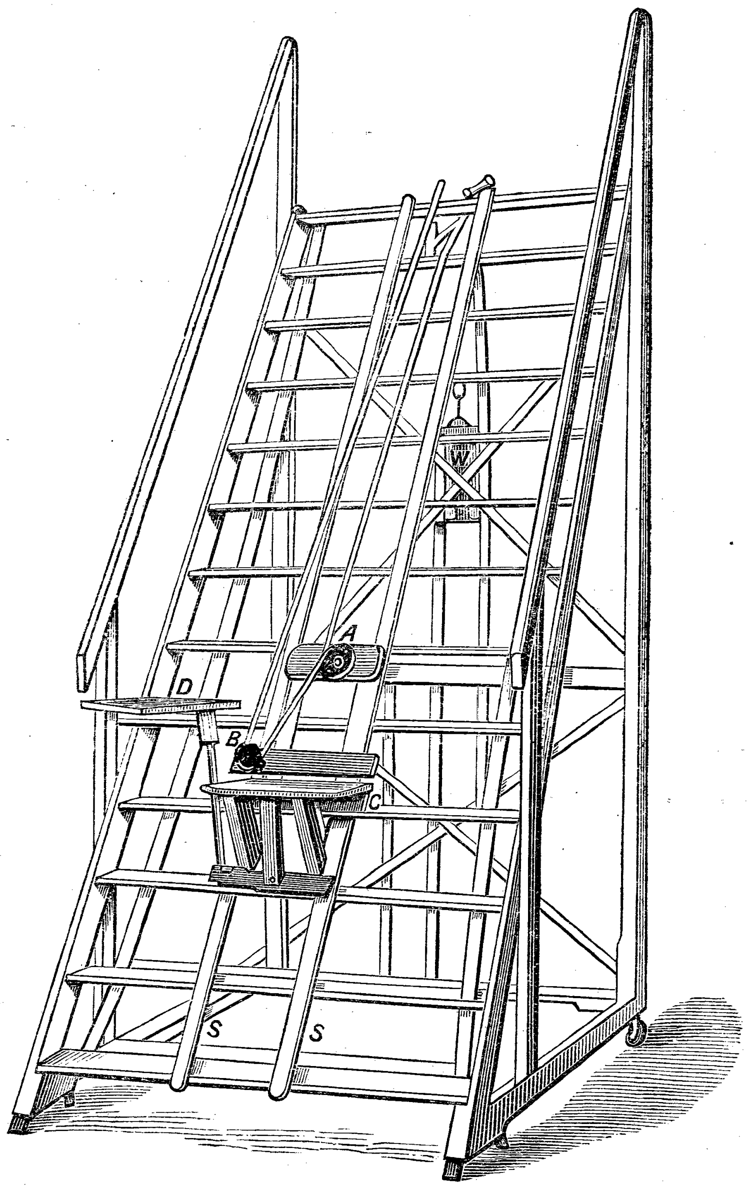
The problem of a perfect seat for the Equatoreal can hardly be said to have been solved, although a number of elaborate and costly chairs have been constructed by different observers. I presume the majority of those observing with a large Equatoreal use a simple step-ladder, provided with various cushions, &c., for securing the proper elevation of the eye. This simple apparatus seems to be the most expeditious for actual work, notwithstanding the trouble of always getting in just the right position.

The Dearborn Equatoreal was provided with an elaborate and costly chair, constructed after the model of that devised by Bond, for the Harvard University telescope.

This piece of mechanism was found to be so unwieldy, and

required so much expenditure of muscle to bring the seat in position, and moreover consumed so much time for its manipulation, that practically it has never been of any use. Nearly all observations have, accordingly, been made by the use of an ordinary step-ladder.

During the past year Mr. S. W. Burnham and myself



decided that an adjustable seat attached to the step-ladder would add greatly to the convenience of the observer, and would also economise the time in preparing for micrometer measures. A light and easily manipulated chair is especially desirable for double-star work, since many different objects are often examined on the same night.

After considering the problem, the following mechanism was devised, which, after some months of constant use, seems to answer the purpose admirably.

The accompanying drawing will clearly show the seat mechanism.

Over the central portion of a step-ladder 11 feet in height and 5 feet in width, are screwed two strips of pine, S, S, 2 inches in width, which pass from the top to the bottom of the steps; the distance between them being about 7 inches.

A light wooden frame is made to slide on this track, to which the observing seat, C, is attached. The seat is 20 inches in length and 12 inches in depth. In order to keep it in place, the tracks S S are bevelled on the inside, and the frame is made with a corresponding bevel like an ordinary slide-rest.

The seat, when in use, is raised and lowered by means of the following device.

To the top of the steps is attached a woven rope, three-eighths of an inch in diameter, which is passed *once* around a fixed drum, A, 5 inches in diameter, attached to the seat-frame, thence over a loose pulley, B, thence back again to the top of the steps over a pulley, where a weight, W, is attached just sufficient to balance the seat. The weight W slides in vertical tracks attached to the rear of the step-ladder.

The seat, therefore, is held in position simply by the *friction* of the cord around the fixed drum A, without the use of any clamp or stop.

The whole weight of the seat and frame is about 15 lbs. A very slight force, viz. 10 lbs., will cause it to slide up the track when unloaded.

When seated on the chair, a slight pull downwards, on the rope to which the counterpoise is attached, causes it to descend any amount desired. As the whole merit of the apparatus consists in the ease and celerity with which the observer may secure the proper elevation for the eye, it may be added that the seat is completely under control; it may be moved an inch, or a foot, almost instantaneously, and in this respect is infinitely superior to any screw or rack motion.

For the upward movement it is necessary to rest one's weight on the steps.

As there are no ratchets or stops, but simply a rope wrapped round a smooth drum, the chair can be manipulated in the dark without difficulty. The cost of applying this apparatus to the step-ladder was about five dollars.

When using the micrometer, a small table, D, for holding the note-book, lamp, eye-piece, &c., is attached on the right-hand side of the seat, and may be removed at pleasure. The step-ladder itself is mounted on castors and is easily shifted to any required position.

When micrometer measurements are not in progress, the seat may be slid to the top of the steps, where it is out of the way, and the ladder used in the ordinary way.